

## **Surgical therapy for Bradycardia and Tachycardia**

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The surgical therapy of rhythm disturbances offers a wide range of technical variations, leads, devices and combinations with endovascular strategies. In Germany, over the past 15 years approximately 100.000 de novo implantations of pacemakers and ICDs have been performed. Due to a younger age of the patients at first implantation and extended life expectancy, we observe steep rising numbers of revisions and indications for surgical device-related interventions.

The primary surgical approach is indicated in pediatric patients, patients where pectoral placement is improper for any other reason (radiation therapy etc.) or the patient's preference.

In the most recent era, a growing number of device-related infections requires a surgical implantation technique if both pectoral sites are already used.

Several surgical tools for lead extraction are available. Each of them requires a careful consideration and a proper training, since adhesions have to be expected at any endovascular region. A precise escalation strategy for a well-trained team in a full-equipped cardiosurgical operation theatre (including ECC) is the optimal setting for any extraction attempt.

The subcutaneous ICD implantation as a modern therapeutic option requires knowledge and appropriate surgical technique to achieve optimal results.

Since 2013 in Germany exists an official certificate for pacemaker- ICD- and CRT-therapy with a separate module for surgical revision of the German Society of Vascular-, Thoracic and Cardiac Surgery. Despite the fact, that the community in Germany accounts pacemaker and ICD-therapy meanwhile to the cardiology, the surgical aspects of leads and devices require a close cooperation between cardiology and cardiac surgery.